



# industry and environment

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## industry and environment THE NEXT DECADE

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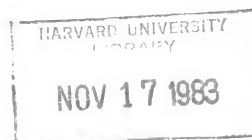
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# Energy and the environment: the next decade

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In the ten years that have passed since the Stockholm conference, the nations of the world have made solid progress in actually improving the quality of the environment while producing and consuming more energy than in any previous decade in history. Official statements<sup>1-4</sup> of the industrialized countries attest to conditions of cleaner air and water than in 1972. Expanding scientific knowledge is helping us in our efforts to deal with the inseparable relationships between energy and the environment. Co-operation between governments and private energy companies, including the development of useful government-industry relationships under the aegis of the United Nations Environment Programme, has matured.

While much remains to be done, I believe that the energy industry can fairly claim that it has taken seriously the basic assumption of the conference's Declaration on the Human Environment — that we all have a responsibility to protect and improve the environment for future generations.

Moreover, we can look back on the past decade as one of growing public understanding of the relationship between energy needs and environment. Demands for "clean" air and water at any cost are giving way to a more sophisticated realization that the cost of environmental improvement beyond a certain point may become prohibitively expensive in relation to any benefits it may provide. While the worldwide concern for the environment in the past decade has been vitally important, I believe this growing appreciation of the economics of the issues involved is also very welcome.

In this climate of greater understanding, I believe that energy companies and governments will make further progress in improving worldwide environmental quality in the coming decade, building on the successful work of such organizations as the International Petroleum Industry Environmental Conservation Association (IPIECA), the International Exploration and Production Forum (E&P Forum), and the Oil Companies International Marine Forum (OCIMF).

At the same time, it is clear that we face some new challenges. I expect that the energy industry will maintain high environmental standards while producing hydrocarbons in increasingly difficult areas, particularly in the Arctic region and offshore; continuing to transport huge volumes of crude oil across the oceans; and moving toward a more complex mix of fuel production, which will involve refinery processing of heavier crude oils, greater use of coal, and more reliance on nuclear power.

What are the prospects for maintaining — or improving — world environmental quality in the 1980s in the face of changing energy demands? Let us look at each fuel in turn, beginning with oil and natural gas, which will continue to be the world's staple fuels for some years.

For various reasons, two developments of the 1970s — increased production of crude oil in the Arctic regions and in offshore waters generally — can be expected to continue. The



**Figure 1** Exploratory drillers exercised the utmost care to protect Sable Island's ecological balance for its famous horses and wildlife. (Nova Scotia)

United States, once virtually self-sufficient in hydrocarbons, is now making intense efforts to replace declining reserves for national security reasons, and some of the best prospects for doing so are in Alaska, both on and offshore, and in other coastal waters. Oil companies operating in Canada have made significant finds, particularly in the Atlantic and the Beaufort Sea. The Soviet Union is also seeking new reserves in offshore areas and in the Arctic regions of Siberia. North Sea oil and gas production will continue. Some developing countries without significant oil reserves are trying hard to find them, frequently in their coastal waters.

I believe the available evidence shows clearly that oil companies can handle the environmental problems posed by Arctic oil production. Companies producing oil and gas on the Alaskan North Slope have maintained an excellent record. The Alaska pipeline has not disturbed the ecology of the tundra or the lifestyle of animals in the area. Furthermore, imaginative solutions to new problems — for example, ways to combat the dangers posed by pack ice and icebergs to offshore oil installations — are coming off the drawing boards, including man-made islands strong enough to withstand the movement of pack ice, underwater production equipment buried deep enough in the ocean floor to be protected from the bottom-scouring action of pack ice or icebergs, and floating production systems that can be readily moved when icebergs threaten.

Offshore oil production in other parts of the world should not cause serious environmental problems. In the North Sea, coastal waters of the United States, and elsewhere, it has been demonstrated that oil production can be carried out without harming fishing grounds. Serious accidents on offshore drilling



**Figure 2** Coexistence: caribou and the Trans-Alaska pipeline. (Alaska, USA — Alyeska Pipeline Services Company)

rigs have been remarkably rare. And while studies demonstrate that marine life appears to be unaffected by offshore drilling mud and cuttings discharges, industry monitoring programmes continue to develop further perspectives on this subject — with emphasis on areas perceived to be environmentally sensitive.

As for crude oil transportation across the oceans, I would expect further advances to be made. Over four-fifths of the world's tankers no longer discharge contaminated water at sea, but store it and either off-load it at the next port for processing in refinery oil-water separators or make it part of the next crude oil cargo. This effort has reduced the tanker discharge of oil into the sea by 30 per cent since 1971.<sup>5</sup> Major oil companies all adopted such methods of eliminating discharge of oily ballast into the sea many years ago, and I would hope that all tankers will do so by the end of the 1980s. Ratification of the 1978 IMCO Protocols to the 1973 Marine Pollution Convention, mandating segregated ballast tanks for new tankers and crude oil washing for various sizes of new and existing tankers, should help work toward this goal of minimal intentional oil pollution at sea.

Such tanker safety features as inert gas systems, collision avoidance radar, redundant steering machinery and improved training standards are helping reduce accidental oil pollution. I would expect further progress both in organization and



**Figure 3** Grazing livestock and refinery share a meadow. (Wilhelmshaven, Federal Republic of Germany)

technology to minimize the impact of any accidental spill which occurs. Co-operative organizations equipped with extensive and transportable stockpiles of equipment to supplement local resources, are being developed. Further progress can be expected in the use of booms and skimmers suitable for cleaning up spills in open water, and aerial spraying of dispersants should find broader application.

Refineries, it should be noted, have already succeeded in controlling air and water pollution to a large degree. Emissions of noxious fumes and odours have been, to a great extent, eliminated. Water used for cooling and processing is generally treated to remove most oil and other wastes and is returned to its source often cleaner than when it was first used. Also, air is replacing water as a coolant in some systems where water supply is crucial.

In all aspects of the oil industry, therefore, we expect further success in building on our past environmental record. At the same time, the 1980s will see increased production of fossil fuels which do present greater challenges.

The most obvious of these is coal. The United States, with immense reserves, is expected both to make far greater use of them in the coming decade for electricity generation, and to begin exporting growing volumes of steam coal to Western Europe and Japan, as they try to reduce their dependence on imported oil. The Soviet Union also has the potential for vastly increased coal production, and other nations — Australia and Canada, for example — should produce much more coal for export in the 1980s. Because of high capital cost, new facilities for extensive conversion of coal into synthetic oil and gas are unlikely in the coming decade. Other fossil fuels, may begin to make a bigger contribution to total world energy needs. Venezuela is preparing to make large investments in producing heavier oils from the Orinoco tar belts, Canada should get some increased oil production from the Athabasca tar sands, and a long list of countries — including the United States, Australia, the Soviet Union, Morocco, and Brazil — have either taken steps to produce oil from shale in this decade, or contemplate doing so.

The switch to heavier fossil fuels has already caused much popular concern, primarily seen in some nations' fear of the effects of acid rain and the general fear that excessive use of these fuels may so build up carbon dioxide in the atmosphere that the earth's temperature may increase, with some disastrous consequences. Both of these fears should be seriously addressed.

Acid rain is certainly a reality and may indeed be associated with the burning of fossil fuels. In face of the evidence already accumulated, primarily on acid rain's effects on fish in lakes in Norway, Sweden, the U.S. Adirondacks, and Eastern Canada, no one in industry should take this problem lightly. While we have learned in the past to be suspicious of some of these claims that lakes are "dead" (the premature rumours of the death of Lake Erie in the early 1970s comes to mind), there is no doubt that a problem exists. What is in doubt are the nature and causes of the problem and, in turn, the solution to it. A typical example of the basic information needed is the relationship between long-distance atmospheric transport of acidic precursors and the mechanisms that cause their conversion. The development of such information will dispel existing scientific uncertainty and enhance our ability to identify appropriate controls to solve the problem.

It is therefore encouraging to know that more nations have begun to study this problem. The memorandum of intent signed by the United States and Canada will explore the transnational aspects of acid rain. There are also on-going discussions of the problem being conducted in the European Economic Community.

Speaking as an oil-company executive with extensive experience of the ways of government regulation, I would add only one word of caution. Particularly since acid rain is an issue that can easily be overdramatized, I would hope that any curbs on the burning of fossil fuels to reduce it would go no further than the scientific evidence requires. Critical questions, including the benefits to be achieved from tightening of emission standards and the contribution of fossil fuel emissions to the total acidity of the ecosystem, remain to be addressed. Restrictions imposed by bilateral treaties or wider multinational agreements should go no further than justified by scientific evidence.

As for the so-called "greenhouse effect" of carbon dioxide buildup, I recognize that this too may become a serious issue for the future. But I believe such international efforts as UNEP's Earthwatch international surveillance network, and studies by government agencies and such prestigious institutions as the National Academy of Sciences in the United States, can supply us with the information to deal with this problem well before the catastrophic consequences which some predict can happen.

Among the near-term alternative resources, shale oil can be expected to make a contribution to world energy supply in the coming decade, although the contribution will no doubt be less than the energy industry would like. In the United States, where potential for shale development may be greatest, we would expect production to be severely restricted by the requirements of the Clean Air Act. I believe that concerns about solid waste disposal and water availability are manageable — both because of industry skills in dealing with them, and because of the limited scale of operations which can be undertaken by 1990. Other nations with shale potential are also unlikely to reach production levels in the coming decade which will be high enough to trigger new environmental problems.

Altogether, therefore, it appears that environmental problems posed by increased use of coal and the beginning of synthetic fuel development in the 1980s will be eminently manageable. New issues, such as acid rain and the danger of carbon dioxide buildup, need to be carefully monitored, and action taken if necessary. Ironically, the United States may have a problem effectively using its fossil fuel energy, rather than a problem protecting the environment because of its unbridled

use — that is, the consumption of abundant coal in the United States may be unnecessarily restricted by inflexible air quality regulations.

One energy source remains to be discussed — nuclear power. Environmental questions about release of radioactivity, and radioactive waste disposal, plus the fear of nuclear weapons proliferation, have been cited as reasons for a moratorium on nuclear power plant construction in a growing number of Western countries, and for discouraging such construction in developing nations.

Again, I remain optimistic that these problems can be solved. Disposal of radioactive wastes, for example, is less a technical matter than a question of public acceptance. Mixing the wastes into molten glass which can then be sealed in welded steel containers, or putting them in deep salt beds or rock formations, are promising methods of dealing with the problem, especially since the total volumes will be small.

Furthermore, nuclear power, which is not identified with the "greenhouse effect" or acid rain, holds great promise — particularly for developing nations which lack indigenous fossil fuel resources. I would hope, therefore, that a more reasonable view of the manageability of nuclear pollution problems will prevail in the 1980s.

Beyond the 1980s, other energy technologies will grow in importance. Renewable sources, especially solar energy in its various forms and thermonuclear fusion, have major potential. Biomass conversion, along with wind and tidal power, may also play a role. Each of these offers some environmental benefits, but also poses new environmental challenges in any scale-up to significant production. Each will no doubt assume greater significance in environmental protection when UNEP enters its third decade.

In the coming decade, however, I would expect further improvements in environmental quality even as energy companies and governments begin to manage the long-term transition from major reliance on oil and gas toward a new mix of fuels. And with expansion of scientific knowledge, and co-ordination between industry and governments, I believe we can continue to protect our environment for future generations, while providing the energy on which improvement in world living standards depends.



**Figure 4** As energy exploration proceeded species of seals and varieties of shorebirds and waterfowl continued to use Sable Island as their home or seasonal nesting ground. (Nova Scotia)

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